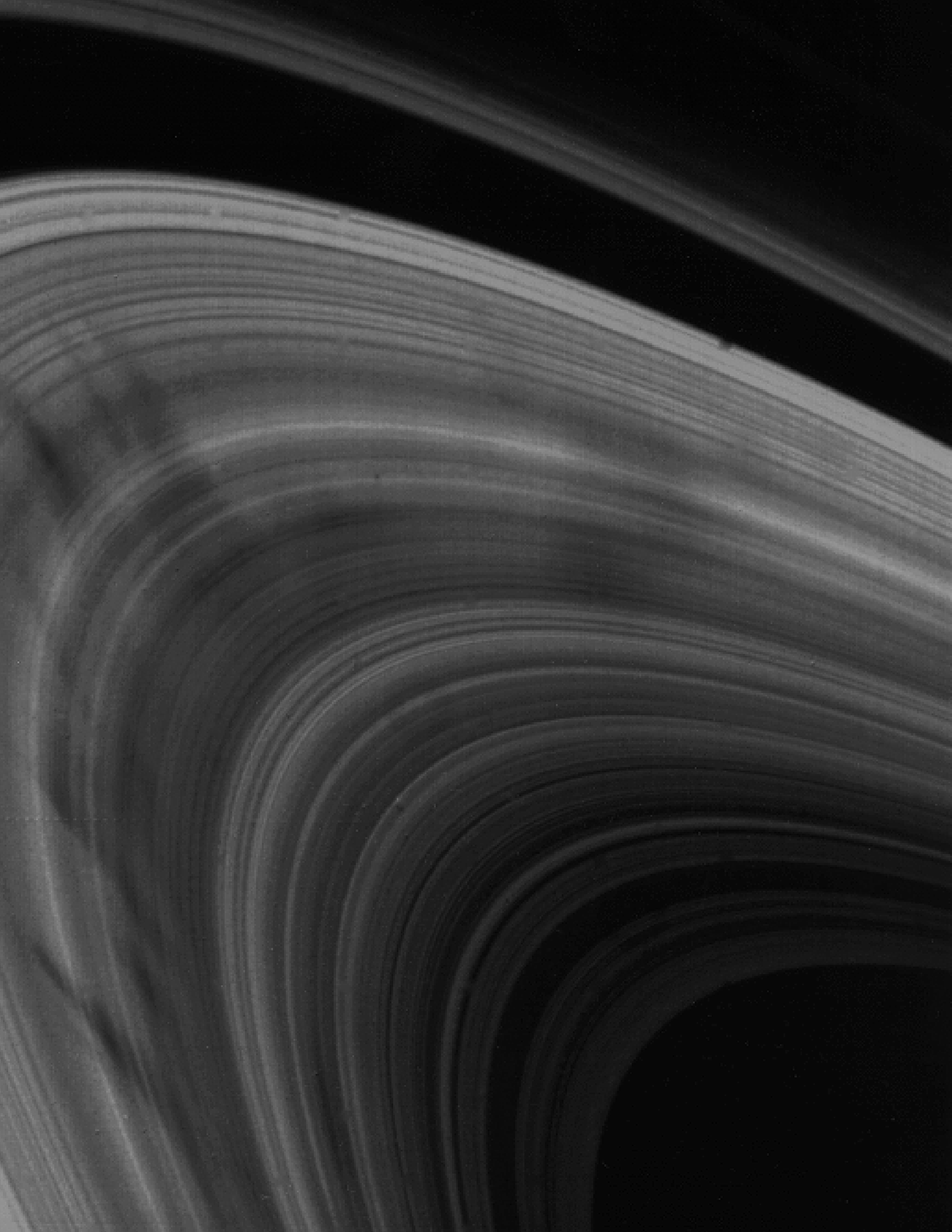
# Passage to a Ringed World

## The Cassini–Huygens Mission to Saturn and Titan



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On the Cover: A collage of images shows the destination of the Cassini–Huygens mission — the Saturn system. The insets, from left, are Enceladus, Saturn and Titan. The collage represents the mission's five chief areas of scientific investigation: icy satellites, Saturn, Titan, rings and the magnetosphere. (Magnetospheric and plasma processes produce the "spokes" that run out across the rings as diffuse, dark markings.)

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## The Cassini–Huygens Mission to Saturn and Titan

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# FOREWORD

This book is for you. You will find that it lives up to the promise of its cover and title. The text is authoritative, but at the same time easy to understand. It is written for any layperson who is interested in space exploration. In this book, we will give you a good look at what is involved in sending a large spacecraft to the outer solar system. Join us and share in the excitement of this extended voyage of discovery!

One of the first things you will learn is that Cassini–Huygens is an international mission. Seventeen countries are involved. You will also learn that Huygens is an atmospheric probe that the Cassini spacecraft will deliver to Titan, the largest moon of Saturn. Titan has a gaseous atmosphere that is thicker and more obscuring than the atmosphere here on Earth. We will look through Titan's atmosphere with Cassini's radar and discover surface details for the first time. The mission will find out if there are really liquid hydrocarbons on Titan's surface in the form of lakes or seas.

The Cassini spacecraft itself will spend four years in orbit about Saturn. We will examine the rings and visit many of the satellites. We will sample special locations in the magnetosphere that are believed to harbor interesting – some might say strange – plasma processes (that is, electromagnetic interactions involving electrons, protons and ions).

You can see in the table of contents the "menu" we have prepared for you. One chapter explains the mission, another the spacecraft. Other chapters tell you about Saturn, Titan, the rings and the various other parts of the Saturn system. These chapters reflect the facts and theories as we know them today. The chapters were prepared by expert researchers in each of the areas covered. Professional writers then edited the text for clarity and to make sure that you would not be overwhelmed with jargon and technospeak. Working hand-in-hand with them were graphic designers and illustrators who created the

page layouts and the many informative diagrams. Finally, to assure that the final product was accurate, the book was reviewed by scientists and engineers who work on the Cassini–Huygens mission.

Come with us now as we set out on this voyage of exploration. We have over three billion kilometers to go! It will take more than six years to reach Saturn. We will get there on July 1, 2004. By the end of the Cassini–Huygens mission, four years later, we will have completed the most complicated scientific experiment ever performed.

We wish you good reading!

Richard J. Spehalski
Cassini Program Manager

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Cassini Project Scientist

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This book would not have been possible without the outstanding efforts of many talented people, from the authors who wrote the chapters, to the editors and reviewers, to the graphic designers, artists and finally the printer. I would like to thank all of them for their excellent work. Many long hours went into developing the exciting Cassini–Huygens book you hold in your hand. Cassini–Huygens plans to reap a bountiful harvest of new information about the Saturn system, so stay tuned!

Many individuals worked diligently on writing the chapters in this book. These dedicated authors include Vince Anicich, Scott Bolton, Jim Bradley, Bonnie Buratti, Marcia Burton, Roger Diehl, Stephen Edberg, Candy Hansen, Charley Kohlhase, Paulett Liewer, Dennis Matson, Ellis Miner, Nicole Rappaport, Laci Roth, Linda Spilker and Brad Wallis. I also thank Stephen Edberg, Charley Kohlhase, Ellis Miner and Randii Wessen for their support in creating the Appendices.

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